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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/591,432	06/09/2000	Miller Baird McDonald JR.	22727/04060	3078

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EXAMINER

MILLER, RYAN J

ART UNIT	PAPER NUMBER
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2621

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DATE MAILED: 03/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/591,432

Applicant(s)

MCDONALD ET AL.

Examiner

Ryan J. Miller

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) 26-30 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 31-50 is/are allowed.
- 6) ☒ Claim(s) 1,3,5,6 and 51 is/are rejected.
- 7) ☒ Claim(s) 2,4 and 7-25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 June 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. The response received on November 28, 2003 has been placed in the file and was considered by the examiner. An action on the merits follows.

Response to Arguments

2. Applicant's arguments filed November 28, 2003 have been fully considered. A response to these arguments is provided.

Drawing Objections

Summary of Argument: Regarding the objection to the drawings as failing to comply with 37 CFR 1.84(p)(5), the applicant submits that the drawings as filed are acceptable and require no correction. Further, the applicant states that a substitute drawing page containing an acceptable formal drawing of Fig. 9 will be provided upon an indication of allowable claims.

Examiner's Response: Upon further review, the drawings comply with 37 CFR 1.84(p)(5). Therefore, this objection has been withdrawn. However, an objection to the drawings will remain in effect until a substitute drawing page containing an acceptable formal drawing of Fig. 9 is submitted.

37 CFR 1.75 Claim Objections

Summary of Argument: With regard to claims 20-22, the applicant argues that the amendment of these claims overcomes the objection.

Examiner's Response: The examiner agrees. The objection to the claims 20-22 has been withdrawn.

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35 U.S.C. 112, First Paragraph Rejections

Summary of Argument: The applicant argues that the amendments to the claims overcome the 35 U.S.C. 112, first paragraph rejection.

Examiner's Response: The examiner agrees. The rejection of these claims under 35 U.S.C. 112, first paragraph has been withdrawn.

Prior Art Rejections

35 U.S.C. 102(b) rejections

Summary of Argument: The applicant argues that McNertney (U.S. Patent No. 5,864,984 A) fails to disclose all of the elements of claims 1, 3, 5, and 6 of the present application. More specifically, the applicant argues that A) McNertney fails to disclose "identifying each of the plurality of seedlings in the captured digital image". Instead, McNertney identifies a region of interest, which is a section of a grid in which a seedling is expected to be found. By identifying a ROI instead of a discrete seedling, the McNertney reference is prone to erroneous measurements. The applicant further argues that B) McNertney fails to disclose "determining a primary path of each of the plurality of seedlings". Instead McNertney determines the root path, not the primary path, of each seedling. Finally, the applicant argues that C) McNertney fails to disclose "determining a seed vigor index based on the value determined from the primary path ...". Instead, McNertney merely discloses a "root vigor" index.

Examiner's response: Examiner disagrees. Regarding argument A), McNertney does disclose "identifying each of the plurality of seedlings in the captured digital image". While it is correct that McNertney identifies an overall region of interest, McNertney also obtains a seed ROI within which a particular seed is located and then obtains "successive captured images of

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the seed as it germinates” (see column 9, line 66 - column 10, line 6). Therefore, it is clear that each of the plurality of seedlings is identified in the captured image. Regarding argument B), the scope of the claim does not exclude only the root from defining the primary path. In fact, the applicant’s specification defines the primary axis as “the path from the start junction down to the terminal junction of the primary (longest) root of the radicle” (see applicant’s specification: page 26, lines 14-15). Therefore, if one considers the seed the “start junction”, then the primary path would be the length of the root and this limitation is met by the reference. Finally, regarding argument C), McNertney discloses “determining a seed vigor index”. The examiner has the right to give claimed terms a “broadest, reasonable interpretation”. Therefore, since the seedlot vigor index in McNertney is determined based on a “value determined from the primary path ...”. This seedlot vigor index is equivalent to the claimed seed vigor index. The examiner suggests adding limitations to the claim that more clearly define the invention such as information stating that the primary path is determined using both the length of the roots and the stem to overcome this rejection.

35 U.S.C. 103(a) rejections

Summary of Argument: The applicant argues that the rejection of claim 28 under 35 U.S.C. 103 is rendered moot by the withdrawal of claim 28 without prejudice.

Examiner’s response: The examiner agrees.

Compact Disc Submissions

3. This application contains data files on CD-ROM/CD-R that is not are not in ASCII file format. See 37 CFR 1.52(e). Files SEEDANLZ.CPP, IMAGE.CPP, and IMGTHINN.CPP are

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not in an ASCII format. Applicant is required to resubmit file(s) in ASCII format. No new matter may be introduced in presenting the file(s) in ASCII format.

Claim Objections

4. The following quotation of 37 CFR § 1.75(a) is the basis of objection:

(a) The specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

5. Claim 51 is objected to under 37 CFR § 1.75(a) as failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention or discovery. The claim language, “disposed at angle” is grammatically awkward, and difficult to understand. The examiner suggests changing this limitation to read “disposed at an angle”. The claim language “at angle as nearly vertical as practical” is unclear. When is an angle “as nearly vertical as practical”? Is a 45° angle “as nearly vertical as practical”? Is a 20° angle “as nearly vertical as practical”? Is an 88° angle “as nearly vertical as practical”? Clarification of this issue is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 3, and 5-6 are rejected under 35 U.S.C. 102(b) as being anticipated by McNertney (U.S. Patent No. 5,864,984 A).

As applied to claim 1, McNertney discloses a method of automatically analyzing a plurality of seedlings germinated from a plurality of seeds, comprising the steps of capturing a

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digital image of the plurality of seedlings (see column 9, lines 56-57: The reference describes that image capture software is used to obtain an image with the camera.); identifying each of the plurality of seedlings in the captured digital image (see column 9, line 66-column 10, line 3: The reference describes that a seed region of interest (ROI), within which a particular seed is located, is determined (i.e. identifying the at least one seedling).); determining a primary path of each of the plurality of seedlings (see column 10, lines 1-6: The reference describes that the root growth (i.e. primary path) is followed.); determining at least one value from the primary path of each of the plurality of seedlings (see column 11, lines 53-63: The reference describes the accumulation of data (i.e. determining at least one value) regarding root growth (i.e. the primary path) such as the root position and endpoints.); and determining a seed vigor index from at least the values determined from the primary path of each of the plurality of seedlings (see column 12, lines 27-34: The reference describes that data analysis software is used to analyze all of the data (i.e. at least the at least one value determined from the primary path) to determine seedlot vigor.).

As applied to claim 3, McNertney discloses determining at least one value from the primary path of each of the plurality of seedlings comprises determining a value corresponding to the length of the radicle of each of the plurality of seedlings (see column 10, lines 1-6: The reference describes that the root growth (i.e. radicle) is followed.); and determining a seed vigor index from at least the at least one value determined from the primary path of the at least one seedling comprises the step of determining a seed vigor index from at least the value corresponding to the length of the radicle of each of the plurality of seedlings (see column 12, lines 27-34: The reference describes that data analysis software is used to determine the seedlot vigor from information obtained from the length of the roots (i.e. radicle).).

As applied to claim 5, which is representative of claim 6, McNertney discloses determining a primary path of each of the plurality of seedlings comprises determining for each seedling a locus of pixels, the locus of pixels corresponding to the primary path of the respective seedling and the locus of pixels being narrower in width than the width of the at respective seedling in the digital image of the respective seedling (see column 11, lines 6-15: The reference describes that a region of interest (ROI) is determined around a seed (i.e. determining a locus of pixels) that includes the roots of the seed (i.e. the locus of pixels corresponding to the primary path of the at least one seedling). The reference also describes that entire root structure may grow outside of the ROI. Therefore, the ROI (i.e. locus of pixels) is narrower in width than the width of the seedling.).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of McNertney (U.S. Patent No. 5,864,984 A) and McCormac et al. (the article titled "A modified slant board test for vigour testing brassicas"). The arguments as to the relevance of McNertney in the rejection of claim 1 above are incorporated herein.

As applied to claim 51, McNertney discloses a method of automatically analyzing a plurality of seedlings germinated from a plurality of seeds, comprising the steps of capturing a digital image of the plurality of seedlings (see the rejection of claim 1 above); identifying each of

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the plurality of seedlings in the captured digital image (see the rejection of claim 1 above); determining a primary path of each of the plurality of seedlings (see the rejection of claim 1 above); determining at least one value from the primary path of each of the plurality of seedlings (see the rejection of claim 1 above); and determining a seed vigor index from at least the values determined from the primary path of each of the plurality of seedlings (see the rejection of claim 1 above).

Claim 51 further calls for providing a plurality of seedlings pressed into blotter paper disposed at an angle as nearly vertical as practical. This step is absent from McNertney, but is clearly disclosed in McCormac et al. (see Slant board test, page 82 and RESULTS, page 83: The reference describes germinating the seeds on water-saturated blocks of absorbent paper (i.e. blotter-paper) in a container at an angle of 90° (i.e. at an angle as nearly vertical as practical)).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify McNertney by adding the method of germination taught in McCormac et al. because this method reduces the need to straighten the roots before taking measurements, thus leading to more accurate root measurements (see McCormac et al.: RESULTS, column 2, page 83). This method would therefore lead to a more accurate calculation of seedlot vigor.

Allowable Subject Matter

10. Claims 31- 50 are allowed.

11. Claims 2, 4, and 7-25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The examiner has considered the book "International Seed Testing Association Seed Vigour Testing Handbook" (1987) as cited on page 2, lines 4-5 of the specification. The examiner thanks the applicant for supplying this reference.

Loomis et al. (the article titled "Visualization of Plant Growth") is pertinent in that the reference discloses the visualization of plant roots as well as stems. This reference does not disclose determining a seed vigor value from this information.

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan J. Miller whose telephone number is (703) 306-4142. The examiner can normally be reached on M-F 8:00-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H. Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ryan J. Miller
Examiner
Art Unit 2621


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